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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,379	03/23/2004	Jang-Kun Song	8071-128T (OPP 030152US)	1832
7590 F. Chau & Associates, LLC 130 Woodbury Road Woodbury, NY 11797			EXAMINER NGUYEN, THANH NHAN P	
			ART UNIT 2871	PAPER NUMBER
			MAIL DATE 10/03/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/806,379	<b>Applicant(s)</b> SONG, JANG-KUN	
	<b>Examiner</b> THANH-NHAN P. NGUYEN	<b>Art Unit</b> 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 42-61 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 51-58, 60 and 61 is/are allowed.
- 6) ☒ Claim(s) 42-45 and 47-49 is/are rejected.
- 7) ☒ Claim(s) 46, 50 and 59 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 August 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Objections*

Claims 46 and 59 are objected to because of the following informalities:

Claim 46: lines 1-2, limitation "wherein a distance between the major edges of each tilt region is in a range between..." makes the claim unclear.

In light of the disclosure, it will be interpreted as, "wherein a distance between the major edges of each tilt region ***and the curved portion of the second signal lines*** is in a range between..."

Claim 59: line 1, "The liquid crystal display of claim 59" should have been properly as "The liquid crystal display of claim **58**."

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 42-45 and 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al (US 3738120) in view of Asada et al (US 5745207) and Nishikawa et al (US 7119870).**

Song et al disclose (fig. 28) liquid crystal display comprising:

Claim 42:

- a first substrate (not shown)

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- a plurality of first signal lines (not shown) formed on the first substrate, extending in a first direction, and separated from each other by a predetermined interval
- a plurality of second lines (not shown) formed on the first substrate, intersecting the first signal lines
- a plurality of pixel electrodes (22) located substantially in areas defined by the first and the second signal lines and including edges having curved portions
- a plurality of thin film transistors (not shown) connected to the first and the second signal lines and the pixel electrodes
- wherein the thin film transistors include terminal electrodes connected to the pixel electrodes
- a second substrate (not shown) facing the first substrate
- a common electrode (not shown) formed on the second substrate
- a region partitioning member (17, 27) formed on at least one of the first and the second substrates and partitioning into a plurality of tilt regions by the region partitioning member, each tilt region including a pair of major edges parallel to the curved portions of the pixel electrodes
- a liquid crystal layer (not shown) disposed between the first substrate and the second substrate, wherein the liquid crystal layer has negative dielectric anisotropy and is subject to vertical alignment

Song et al lack disclosure of a plurality of second lines including a plurality of curved portions; each tilt region including a pair of major edges parallel to the curved portions of the second lines.

Asada et al disclose (fig. 3) a plurality of second lines (3) including a plurality of curved portions for the benefit of achieving wide viewing angle and high aperture ratio (col. 6, lines 60-67; col. 7, lines 1-5).

It would have been obvious to one of ordinary skill in the art to modify Song et al device with the teaching of Asada et al to form a plurality of pixel electrodes located substantially in areas defined by the first and the second signal lines and including edges extending substantially parallel to the curved portions of the second lines, and a region portioning member partitioning into a plurality of tilt regions, wherein each tilt region including a pair of major edges parallel to the curved portions of the second signal lines for the benefit of achieving wide viewing angle and high aperture ratio.

Song et al further lacks disclosure of a plurality of third signal lines formed on the first substrate, extending substantially in the first direction, and overlapping the pixel electrodes to form storage capacitors.

However, it is well known in the art to form a third signal line on the first substrate, extending substantially in the first direction, and overlapping the pixel electrodes to obtain extra storage capacitor, as evidenced by Nishikawa et al (Fig. 4).

Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to form a plurality of third signal lines on the first substrate, extending substantially in the first direction, and overlapping the pixel electrodes to obtain extra storage capacitor.

Claim 43:

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Song et al disclose a liquid crystal display with all the limitations recited in claim 42, except a pair of crossed polarizers are provided on outer surfaces of the first and the second substrates, respectively, and the first and the second polarizers are aligned so that one of the transmissive axes of the polarizers is parallel to the first signal lines.

It would have been obvious to one of ordinary skill in the art to form a pair of crossed polarizers are provided on outer surfaces of the first and the second substrates, respectively, and the first and the second polarizers are aligned so that one of the transmissive axes of the polarizers is parallel to the first signal lines as the designer's desire; thus, it does not patentably distinguish the invention.

Claim 44:

- wherein the region partitioning member (17, 27) comprises a plurality of cutouts formed in the common electrode

Claim 45:

Song et al disclose a liquid crystal display with all the limitations recited in claim 44, except wherein the cutouts have a width ranging about 9 microns to about 12 microns.

Even though Song et al do not explicitly disclose wherein the cutouts have a width ranging about 9 microns to about 12 microns, it would have been also obvious to have the cutouts' width ranging about 9 microns to about 12 microns because if it is less than 9 microns, it might not function well as the alignment controlling; if it is more than 12 microns, it might reduce the aperture ratio in the electrodes.

Therefore, the limitations do not patentably distinguish the invention.

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Claim 49:

Song et al disclose the region partitioning member (91) comprises a protrusion formed on the common electrode (34). However, Nishikawa et al do not explicitly disclose the protrusion having a width ranging about 5 microns to about 10 microns.

Similarly, it would have been obvious to one of ordinary skill in the art to have the protrusion's width ranging about 5 microns to about 10 microns because if it is less than 5 microns, it might not function well as the alignment controlling; if it is more than 10 microns, it might reduce the aperture ratio in the electrodes.

Therefore, it does not patentably distinguish the invention.

Claim 47:

- wherein the tilt regions are classified into four domains based on tilt directions of liquid crystal molecules included therein upon application of an electric field

Claim 48:

Even though Song et al do not explicitly disclose the number of the tilt region is four if a planar area of the pixel region is smaller than about 100x300 square microns, and the number of the tilt regions in a pixel region is four or eight if a planar area of the pixel region is equal to or larger than about 100x300 square microns, it would have been obvious to one of ordinary skill in the art to have the number of the tilt regions in the pixel region based on the area of the pixel region at least for the benefit of having the alignment controlling as desired to improve the viewing angle. Thus, it does not patentably distinguish the invention.

***Allowable Subject Matter***

Claims 51-61 are allowed.

Claims 46 and 50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reason for allowance: There is no prior art of record that teaches or suggests a liquid crystal display comprising a relationship of various elements as claimed with the specific allowable subject matter cited in the following claim:

Claim 46:

- wherein a distance between the major edges of each tilt region and the curved portion of the second signal lines is in a range between about 10 microns and about 30 microns

Claim 50:

- wherein one of the terminal electrodes includes an expansion having a quadrilateral shape, wherein at least one side of the quadrilateral shape has an angle with respect to the lengthwise direction of the third signal line of about 45 degrees

Claim 51:

- a data line formed on the semiconductor layer at least in part and including a curved portion and an intermediated portion crossing the gate line substantially at a right angle, at least one of the curved portions and the intermediate portions



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having a source electrode, wherein the intermediate portion extends from the curved portion at an angle with respect to the curved portion

- a pixel electrode formed on the first passivation layer, connected to the drain electrode, and having an edge extending substantially parallel to the curved portion of the data line
- a storage electrode line formed on the substrate, extending substantially parallel to the gate line, and including a storage electrode, having an increased width with respect to a width of the storage electrode line, wherein the storage electrode has a quadrilateral shape and an edge of the storage electrode is inclined by an angle of about 45 degrees with respect to a lengthwise direction of the storage electrode line
- a region partitioning member formed on at least one of the first and the second substrates and partitioning into a plurality of tilt regions by the region partitioning member

Claims 52-61 are allowed since they depend of allowed claim 51.

### ***Response to Arguments***

Applicant's arguments with respect to claims 42-45 and 47-49 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6,987,551.

US 6,771,345.

US 2004/0201811.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to (Nancy) Thanh-Nhan P. Nguyen whose telephone number is 571-272-1673. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

-- September 25, 2008  
TN

/David Nelms/

Supervisory Patent Examiner, Art Unit 2871